

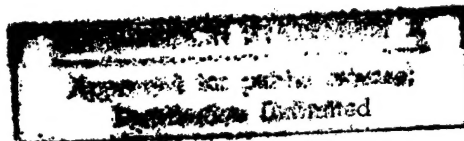
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# China Report

SCIENCE AND TECHNOLOGY



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13 August 1984

## CHINA REPORT

### SCIENCE AND TECHNOLOGY

#### CONTENTS

##### PEOPLE'S REPUBLIC OF CHINA

##### NATIONAL DEVELOPMENTS

Meeting Held on Technological Revolution Lectures (Zou Aiguo, Luo Changhua; XINHUA, 24 Jun 84) .....	1
Regulations Reforming Scientific Work Offered (Guangxi Regional Service, 9 Jul 84) .....	3
Gansu Conference on Science, Technology Concludes (Gansu Provincial Service, 24 Jun 84) .....	6
Tianjin: Liu Zengkun on Technological Progress (Liu Zengkun; TIANJIN RIBAO, 6 Apr 84) .....	8
Ma Hong on New Technological Revolution (He Ling; SHIJIE JINGJI DAOBAO, 21 May 84) .....	11
Briefs Book on Technology .....	16

##### APPLIED SCIENCES

PRC, Italy Cooperate on Space Technology (Huang Changrei, Fu Wenlong; XINHUA, 11 Jun 84) .....	17
PRC Scientists Join Europeans in Nuclear Research (XINHUA, 7 Jul 84) .....	19
Applied Nuclear Technology Finds Wide Range of Applications (XINHUA, 30 Jun 84) .....	20
Briefs Largest Telescope Being Installed .....	21

ABSTRACTS

ACOUSTICS

YINGYONG SHENGXUE /APPLIED ACOUSTICS/ No 1, Jan 84 ..... 22

## NATIONAL DEVELOPMENTS

### MEETING HELD ON TECHNOLOGICAL REVOLUTION LECTURES

OW250200 Beijing XINHUA Domestic Service in Chinese 1149 GMT 24 Jun 84

[By reporters Zou Aiguo and Luo Changhua]

[Excerpts] Beijing, 24 Jun (XINHUA)--Sponsored by the CPC Central Committee Organization Department and five other units, the second round of the lectures on knowledge of the new technological revolution for cadres of various units under the CPC Central Committee and various state organs at and above the level of departmental and bureau directors will begin in late July. This round consists of 10 lectures, primarily aimed at introducing the science and management and also knowledge of other science areas in the light of the characteristics of the new technological revolution.

This was revealed by a discussion meeting held in Beijing today by the Hunan Science and Technology Publishing House to discuss the publication of the lecture sheets "Lectures on Knowledge of New Technological Revolution." The 10 lecture sheets for the first round of the "Lectures on Knowledge of the New Technological Revolution" have been published recently by this publishing house in book form entitled "Greet the New Technological Revolution" (first of two volumes). The title of the book was written by Wang Zhen.

At the discussion meeting, responsible comrades of the CPC Central Committee Organization Department relayed the opinions of Comrades Hu Yaobang and Zhao Ziyang on paying attention to studying the new world technological revolution and our policy to cope with this revolution.

The "Lectures on Knowledge of the New Technological Revolution" are jointly sponsored by the CPC Central Committee Organization Department, the Ministry of Labor and Personnel, the State Scientific and Technological Commission, the China Association for Science and Technology, the Party Committee of Organs Directly under the CPC Central Committee [zhong zhi ji guan dang wei 0022 4160 2623 7070 8093 1201], and the CPC Central State Organs Committee [zhong yang guo jia ji guan dang wei 0022 1135 0948 1367 2623 7070 8093 1201]. The purpose of these lectures is to acquaint the vast number of cadres, particularly high- and middle-level leading cadres, with the rising technological revolution and its impact on our society so that they may meet the challenge and take appropriate measures in good time to speed up our country's program of the four modernizations.

The 10 lectures making up the second round of this series will be published by the Hunan Science and Technology Publishing House as the second volume of the book "Greet the New Technological Revolution."

Among those attending today's discussion meeting were Feng Wenbin, secretary of the Party Committee of Organs Directly under the CPC Central Committee; Song Yiping, secretary of the CPC Central State Organs Committee; and Wang Zhaohua, deputy head of the CPC Central Committee organization department.

CSO: 4008/353

## NATIONAL DEVELOPMENTS

### REGULATIONS REFORMING SCIENTIFIC WORK OFFERED

HK100743 Nanning Guangxi Regional Service in Mandarin 1130 GMT 9 Jul 84

[Excerpts] In order to further implement the party's strategic principles that economic construction should be dependent on science and technology and that science and technology should be oriented to economic construction, and to promote the development of scientific and technological undertakings in our region, the autonomous regional people's government recently formulated 10 regulations on reforming scientific and technological work in our region:

1. The development of science and technology should be coordinated with economic development. It is necessary to develop science, technology, and economy in light of the natural and actual conditions in our region, to integrate the introduction of foreign technology with reform and originality, and to combine the study of traditional industrial technology with the study of new industrial technology. It is necessary to concentrate on the practical technologies urgently needed in current production and to do a good job of applying and developing production technologies in our studies. It is necessary to organize the formulation of the Seventh 5-Year Plan and the 10-year plan for the development of science and technology.

2. The decisionmaking power of scientific research units should be expanded. The leading bodies of scientific research units are required to implement the system of personal responsibility of the president of a research institute. In accordance with the stipulations of the higher authorities, the president of a research institute has the right to decide on the personnel, finance, materials allotment, and plan for scientific research in his unit. The post of secretary of the leading party group should be held by a comrade who is enthusiastic about scientific and technological work, who has a good understanding of intellectuals, and who understands the party's policy toward intellectuals.

3. Technological transfer should be organized and the popularization and application of achievements in science and technology should be advanced. All units can speed up the expansion and transfer of achievements in science and technology by numerous forms and methods such as establishing various associations for scientific research, design, production, and sales and instituting a system of rural technological popularization for the coordination of experiments, demonstrations, training, and popularization.

4. Importance should be attached to the study and application of new technologies. All departments and units should adopt the policy of giving preferential treatment to encourage the production, enterprise management, and service departments to study and adopt new technologies. The supply of goods, equipment, and materials needed for the new technologies should be given top priority. The newly increased output value attained through the popularization and application of new technologies may be exempt from certain forms of taxation. The units or individuals who have made contributions to and attained notable achievements in the study, popularization, and application of new technologies should be commended or rewarded.

5. Science and technology should be opened to the outside world. It is necessary to extensively launch technological and commercial cooperation, economic cooperation, technological exchange, and academic exchange with other provinces and with foreign countries and to vigorously import advanced technology, manpower, and intellect. The departments concerned should work in close coordination, facilitate circulation, and simplify the procedure. All units are encouraged to raise funds to send scientists and technologists to other provinces or foreign countries on tours for investigation, study, and cooperation in research work. Scientists and technologists are allowed to engage in advanced studies abroad at their own expense, and the duration of their study abroad can be included into their length of service. Compatriots from Taiwan, Hong Kong, and Macao, Overseas Chinese organizations and individuals, and friendly people from foreign countries are encouraged to set up scientific and technological undertakings or institutions with joint capital or with their exclusive investment.

6. Knowledge and talented persons should be respected and scope should be given to the role of scientists and technologists. All departments and units should educate through criticism those who do not respect knowledge and talented persons. It is necessary to sternly punish those who have a domineering work style, who boycott knowledge, and who attack and suppress scientists and technologists.

7. Importance should be attached to the development of intellectual resources and the scientific and technological level should be raised. All localities, departments, and units should help scientists, technologists, and scientific and technological management personnel make up for their deficiencies in knowledge and refresh their knowledge in various stages and ways and by various forms. Scientific research units, universities and colleges, and democratic parties are encouraged to train talented persons in various fields for society, to adopt effective measures to raise as quickly as possible the scientific and educational level and the level of production technology of skillful craftsmen, peasant technicians, scientific households, and specialized households in the rural areas. It is particularly necessary to attach importance to and strengthen scientific and technological training work in the areas inhabited by minority nationalities and in backward areas.

8. The economic management of science and technology should be improved and scientific and technological development funds should be established. Investment in science and technology should be gradually increased in the financial budgetary expenditure at various levels.



9. Importance should be attached to scientific and technological information work. The scientific research information institutions at various levels are required to pay close attention to the new technological revolution and economic development trends at home and abroad; to strengthen the comprehensive analysis, study, and report of information; and to provide technological and market information for strategic policy decisions, scientific research, and the development of various trades and professions.

10. The comprehensive function and role of scientific and technological management departments at various levels should be given full play. The scientific and technological departments at various levels are required to be bold in carrying out reform and blazing new trails, to pay attention to key points and typical examples, to strengthen coordination and cooperation with the relevant departments, and to constantly raise their management level and work efficiency.

CSO: 4008/353

## NATIONAL DEVELOPMENTS

### GANSU CONFERENCE ON SCIENCE, TECHNOLOGY CONCLUDES

HK250510 Lanzhou Gansu Provincial Service in Mandarin 1100 GMT 24 Jun 84

[Text] This afternoon, the provincial conference on scientific and technological work concluded in Jinchang City. Focusing on problems of structural reform in scientific and technological circles, the conference has summed up and exchanged experience, and has commended a group of advanced collectives and advanced individuals who have made remarkable achievements in giving impetus to scientific and technological progress. Also, the conference has made contracts for more than 100 projects for tackling key problems and for training qualified personnel.

In the course of discussion, the conference has also invited experts, scholars and leading comrades from scientific and technological research units, colleges and universities, and the departments concerned directly under the provincial authorities to participate in special forums on structural reform in scientific and technological circles, the training qualified personnel, and the exchange of qualified personnel. Also, they have worked out some specific plans and measures. At the conclusion of the conference, Jia Zhijie, deputy secretary of the Provincial CPC Committee, made a speech.

Comrade Jia Zhijie stressed: In the course of structural reform in scientific and technological circles, we must eliminate leftist influence and fully understand that scientific and technological work is an important part of economic work. Science and technology come from production and, on the other hand, serve production. Only when we carry out reform can we overcome a variety of malpractices which exist in the scientific and technological systems as well as scientific and technological work, and can we completely break away from the practice of eating from the same big pot and fully mobilize the initiative of scientific and technological units and staff.

Comrade Jia Zhijie pointed out: The development of the economy depends on science and technology; whereas the progress of science and technology depend on qualified personnel. The province is backward in the area of science and technology and, basically speaking, lacks qualified personnel. For this reason, it is our urgent task to speed up the training of qualified personnel. When we train qualified

personnel, we must resolutely carry it out through various channels and at various levels. We must uphold the principle of running schools with local funds, depending on local training, recruiting students according to their orientation, meeting demands of prefectures and counties, and sending qualified personnel to where they belong. At the same time, we must also invite qualified personnel from other places and further implement the policies on intellectuals. We must make more achievements and train more qualified personnel, so that we can give full play to the role of science and technology in the course of the four modernizations.

The conference was also attended by Vice Governors Hou Zongbin and Liu Shu. In addition, the provincial scientific and technological committee awarded certificates and bonuses for the province's 113 outstanding scientific and technological achievements in 1982-83.

CSO: 4008/353

## NATIONAL DEVELOPMENTS

TIANJIN: LIU ZENGKUN ON TECHNOLOGICAL PROGRESS

SK140457 Tianjin TIANJIN RIBAO in Chinese 6 Apr 84 p 2

["Excerpts" of a written speech entitled "Rely on Technological Progress To Create a New Situation in Industrial, Communications, Scientific and Technological Work," delivered by Deputy Mayor Liu Zengkun at the second session of the 10th municipal people's congress--date not given]

[Text] 1. A report on the industrial and communications production and scientific and technological work of 1983.

Nineteen eighty-three was a key year when we shifted the emphasis of economic work on to the path of raising economic results. That year, we continuously implemented the principle of readjusting, restructuring, consolidating and improving and deeply conducted an emulation campaign among the masses to increase production and practice economy. The masses were inspired with enthusiasm. Difficulties were eliminated. Industrial, communications, post, telecommunications, scientific and technological fronts made new achievements and set new records. Principal achievements were as follows: Industrial output continued to develop steadily, new products increased, and the quality of industrial products improved. Achievements were made in turning deficits into profits. We overfulfilled the plan of delivering profits to the state, accelerated the pace of comprehensive consolidation and initially improved the quality of enterprises. We made excellent achievements in scientific and technological work and economic development was promoted. New achievements were made in communications, post, and telecommunications work. We basically ensured the transportation of materials and goods in meeting the needs of production, construction, and livelihood. New progress was made in technological transformation and a new breakthrough was made in technology import. Industrial readjustment was deeply developed and the reform of economic system went on steadily. The purchasing and marketing of daily industrial goods were brisk. Through further implementing the principle of "various sectors of the economy, a diversified economic way, increasing channels and reducing links" to enliven circulation, industrial departments enthusiastically made ways for marketing industrial products, and commercial departments held commodity trade fairs and fairs to market the products in short supply, set up integrated economic centers and commission agents outside the municipality, increased channels, reduced links, vigorously marketed industrial products, promoted production and ensured market supplies.

Our achievements in 1983 were hard-won. Summing up our work in the past year, we had four understandings: First, we must unswervingly implement the principle of economic work centering on raising economic results. Second, we should pay attention to tapping potentials in order to accept a challenge. Third, we should consciously rely on the masses to conduct the four modernizations. Fourth, leaders at all levels should improve workstyle, go deep into reality, conduct study and investigations and firmly attend to the work.

## 2. The situation and tasks in 1984.

The year 1984 is a key year in creating a new situation to raise economic results. Since the beginning of 1984, the production and revenue of the municipality have registered substantial increases over the same period of last year. Markets are brisk. Our demands for many products continuously increase. This situation is steadily developing. However we must notice that the tasks ahead of us are rather arduous. The state pointed out: Generally speaking, the country must increase production, tax and profits and revenue at the same pace. This sets higher demands for industrial and communications enterprises. However, we have many favorable conditions this year: First, the municipality is further implementing the guidelines of the fourth municipality party congress, gradually conducting party rectification, and readjusting the wages of enterprise staff members and workers. These will further arouse the initiative of the large number of workers, cadres, and scientific and technological personnel in the socialist modernization. Second, through the practices in the past year, many leading cadres further have a clear understanding about the idea of centering on raising the economic results, and some departments and units have preparatory and emergency-handling ability to accept such a severe challenge. Third, the domestic market has a good situation. The purchasing power of the people increases and the marketing of daily industrial products has further enlivened. Heavy industry and especially machinery and electronic industries continue to develop rapidly. Fourth, through scientific and technological development, technological transformation, technological import and technological cooperation, we offer new production ability and technological reserve for 1984. Fifth, through 2 years' of consolidation, many units readjusted leading bodies in line with the demands of the four modernizations and the quality of the enterprises initially improved. Sixth, drawing a lesson from last year, we firmly attended to production and raising economic results from the beginning of this year, and the production and economic results initially increased. This made a good start for the fulfillment of the whole year's tasks.

Generally speaking, the situation is excellent. In 1984, we should continue implementing the principle of readjusting, restructuring, consolidating and improving, take party rectification as an impetus, center on raising economic results, strive to raise the quality of the enterprises, strengthen trade management, improve the management of macroeconomy and continuously create a new situation in industrial and communications output and scientific and technological work.

## 3. Principal work in 1984.

In order to accelerate the pace of creating a new situation, we should attach prime importance to enterprise consolidation, rely on technological progress, firmly attend to readjustment and reform and arouse the masses to deeply conduct the campaign in increasing production and practice economy. In order

to make remarkable progress in the fields of raising quality and variety, reducing consumption and funds, and increasing taxes and profits, we should attend to 10 tasks: 1) We should attend to the work of turning deficits into profits and should pay special attention to increasing profits. 2) We should make great breakthroughs in the variety and quality of products. 3) We should comprehensively consolidate the enterprises and strive to increase their quality. 4) We should do our best to achieve technological transformation and import them as soon as possible. 5) We should accelerate the pace of scientific research and enthusiastically organize force to promote scientific research achievements. 6) We should persistently organize production in line with social demands and enliven the circulation. 7) We should strengthen transformation management to suit the needs and economic development. 8) We should persist in readjustment and reform and enthusiastically explore new paths for reform. 9) We should do a good job in safety production and show concerns over the livelihood of the staff members and workers. 10) We should strengthen the ideological and political work, seek unity of thinking, change our workstyle and be full of vigor.

Our tasks in 1984 are very heavy and we have many difficulties. But the situation is very good. We firmly believe that so long as we conscientiously implement the principles and policies of the central authority and carry out into full play the functions and wisdom of workers, cadres, and scientific and technological personnel under the leadership of the municipal CPC committee, we will certainly eliminate all difficulties, fulfill and overfulfill state plans and create a new situation in our industrial and communications production and scientific and technological work.

CSO: 4008/353

## NATIONAL DEVELOPMENTS

### MA HONG ON NEW TECHNOLOGICAL REVOLUTION

HK130931 Shanghai SHIJIE JINGJI DAOBAO in Chinese 21 May 84 p 7

[Interview by He Ling [0149 0470]: "Ma Yong on the New Worldwide Technological Revolution and Our Approaches"--first paragraph printed in boldface]

[Text] Last October, this newspaper reported on the forum presided over by Premier Zhao on studying the new worldwide technological revolution and our approaches. On 10 May this year, Ma Hong, head of the Academy of Social Sciences of China and a famous economist, had an interview with this reporter and mentioned some of his opinions on this question.

Question: Would you say something about the trend and characteristics of the new worldwide technological revolution?

Answer: The development of science and technology in the last three decades has been swift and violent; there has appeared a number of new technology groups and correspondingly a number of new industrial groups. Information technology, biological technology, new materials technology, new energy resources technology, space technology, oceanic development technology, and so on have given focal expression to the results of the new technological revolution.

Compared with the technological revolutions in history, the new worldwide technological revolution appearing at present have the following five characteristics:

1. The new worldwide technological revolution appears in the forms of technology groups and industry groups.
2. It is the information technology and information industry that take the lead in these technology and industry groups.
3. These new technologies and new industries are characterized by intensive knowledge and technology.
4. The speed of their development is very fast. For instance, the electronic computer first made its appearance 20 odds years ago, now it has already developed to the 5th generation.

5. The development of new technology and new industry have brought about changes in industrial structure, social structure and in the life of people and social ideological trends.

Question: In what way should we realize the challenge made to us by the new worldwide technological revolution?

Answer: There are only 16 years left to us from now to the end of this century, during which the technological revolution that has lasted over three decades since the end of World War II may continue to undergo very great development. The development of the new worldwide technological revolution is marching forward with a complete and perfect technological structure. If we fail to attach attention to it, fail to study it, and fail to exert our efforts to catch up with it with correct approaches, others will make continuous advances while we will lag farther behind. The "sense of urgency" which we have often talked about has never been felt so acutely as it is now.

We can be sure that by the end of this century, the opposition between the socialist and capitalist systems will continue to exist. Therefore, the challenge of the new technological revolution is not only a challenge in economics and science and technology, but also one in politics, it is not only a competition in the economic field, but also between the two social systems. Last October Comrade Zhao Ziyang posed this question gravely, demanding that we lose no time and promptly put forward our approaches so as to meet the challenge of the new technological revolution. We should realize the severe fact of this challenge with a cool head and the opportunity it is bringing us, take rapid action, and meet the challenge with challenge.

Question: What attitudes should we take toward the challenge of the new worldwide technological revolution?

Answer: In the face of the rise and development of the new technologies and new industries in the world, there possibly are three different attitudes.

In one attitude, some people hold that new technologies and new industries are somewhat remote to us; therefore they are indifferent about them, slow in reaction, they have failed to acquire the enthusiasm to inquire about, to find out about and to track them every year, every month, and every week, and to take initiative actions. Such an attitude is erroneous.

In another attitude, some people hold that we can very quickly accomplish the new technological revolution, and we will catch up and surpass economically and technologically developed countries all-round in a very short period of time. Such an idea of being overanxious for quick results deviates from actual conditions.

The third attitude is one of seeking truth from facts. It is based on the state of affairs of our country, based on our needs and possibilities, to adopt the principle of "aiming at a limited target, making the focus conspicuous" in the research and development of new technologies and the building of new rising industries, and to promote our modernizations with as many results of the new worldwide technological revolution as possible.



Obviously, the third attitude is one of seeking truth from facts.

Question: Will you please brief us on the guiding ideas of our approaches?

Answer: We should take the strategic target proposed by the CPC 12th National Congress as our goal, and start from the state of affairs of our country in considering what approaches we should adopt.

What is the state of affairs of our country at present? Comrade Deng Xiaoping has on many occasions said, on one hand China has a great population, on the other, it has a weak foundation. In addition, there is the imbalance in economic development. Specifically speaking, in studying our approaches, consideration should be given to the actual conditions in the following six aspects:

First, although our country has built up a considerable industrial foundation, its modern social infrastructure is still weak, the technological level of its traditional industries and managerial level are still backward, and there exists extreme imbalances in the development of its various regions.

Second, our country has a large gross industrial and agricultural output value, which ranks seventh or eighth in the world, but for a considerably long period of time the average per capita output value will remain rather low.

Third, there is a certain research and development foundation in the new rising technological fields, however, they have not yet developed into economically competitive new rising industries.

Fourth, although our country has made very great achievements in the readjustment and reform of our economic policies, structure, and management, there still exists some links that restrict the development of productive forces in the relations of production and the superstructure.

Fifth, although our country now has a contingent of scientific, technical, and educational personnel possessing a certain level knowledge, the scientific and cultural levels of the masses are comparatively low, and many cadres lack knowledge of modern science and technology.

Sixth, it is true that our country has adopted the policy of opening up to the outside world, but the importation of new technologies will still meet with various obstructions.

If we want to correctly choose our approaches based on the state of affairs of our country, we should work very hard to bring the greatest possible vitality to the 400,000 enterprises in the urban areas of our country and the over 1 million town and township enterprises, to bring about a new breakthrough in the saving of energy and raw materials, to provide the best insurance for raising economic results and increasing the accumulation of capital funds, and bring into full play the role of improving the living standards of the people. To sum up, the approaches should be able to realize the magnificent target of quadrupling the gross industrial and agricultural output value by the end of this century on the basis of promoting the improvement of economic results as much as possible.

Question: What, do you think, are the items of work we should start performing as quickly as possible, in order to meet the challenge of the new worldwide technological revolution, and to seize the opportunity in trying hard to catch up?

Answer: First, we must clearly understand that to seize the opportunity is for the purpose of better fulfilling the strategic target of the socialist modernization of our country proposed by the CPC 12th National Congress, not to develop new rising industries for the sake of new rising industries, nor to develop new technology for the sake of new technology. Therefore, it is necessary to improve economic results, focus on the application of new rising technologies, and step up the pace of technological progress of traditional industries in meeting the challenge. We should overleap as many developmental stages in traditional industries as possible, apply the results of new rising technologies, and raise the levels of technology and management. For example, in the modernization of agriculture, we can overleap the road of "petroleum agriculture" which has been taken by some capitalist countries with a high level of mechanization as its essence, and adopt the road of "biological agriculture," with biological technology as the core, coordinated with good ecological circulation, developing agriculture by enriching this advantage with natural resources and labor resources. At the same time, we should strive to raise the proportion of new rising industries by a rather large margin in the national economy over a comparatively long period of time.

Second, it is imperative to step up the pace of reform. Education must undergo reform, so as to open all roads for studying, and to enhance the exploitation of intellectual resources. We can positively say, the future society is one of intensive knowledge, every step forward we make will be determined by the degree of exploitation of intellectual resources. It is necessary to break up the unitary educational structure and form of running schools, and to train talented people through many channels and layers. We should reform the administrative structure of scientific research as it is necessary to center around the need to develop new rising technologies and industries, unify the transfer of and concentrate the employment of scientific and technological forces. We should step up the pace in the reform of the urban economic managerial structure, so that it will be easier for enterprises to actively adopt new technologies, transform the traditional industries based on the needs of their existence and development. Also, we can make the reform of the operational and managerial structures of new rising industries a breakthrough in the reform of the economic structure of the whole country. We can organize integrated bodies linking scientific research, development, and production, under the principle of being responsible to the state, these integrated bodies may be freed from the restrictions of the existing economic managerial structure, with the state giving them special financial aid and a high level of decision-making power, including the right of making external contacts, so as to lose no chance in importing new technologies.

Third, while supporting the key projects of the country, various localities should develop new rising technologies and industries, and plan the popularization and application of new technology based on their own economic and technological conditions. Special economic zones and coastal cities which are comparatively

developed in science and technology should import more new technology from abroad. In those regions where conditions are suitable, we can consider delimiting an area for concentrated development of new rising technologies and industries. We should permit the appearance of some "specialized households" engaged in the development of new rising technology and in rendering service to relevant industries.

Lastly, only when we make our thinking lively will it be possible to invigorate the economy and to promote the breaking of a new trail in science and technology. The emancipation of the mind is a tremendous motive force in pushing the economy forward. At present, the condition of the stagnation and backwardness in people's thinking gravely exists, old structures and old ideas which have become stumbling blocks to reform must be continuously broken away from. We should learn from Marx his attitude and methods, and attach importance to studying and absorbing the rich results in natural sciences and social sciences created by mankind in our times. While studying and learning from foreign countries, it is unavoidable for us to come across negative things, and imperfection and failure are sometimes unavoidable in probes and reforms, however, all this will be solved with practice. We should by no means refrain from them for fear of a slight risk.

Question: Could you say something about China's future in meeting the challenge of the new worldwide technological revolution?

Answer: I am in favor of doing research on intermediate and long-term plans while drawing up a short-term plan. What will the economy, technology, and society of our country be like by the year 2000? And what will they be like by 2030 or the centenary of the PRC? Our specialists in the natural sciences and social sciences, and responsible comrades in all fields should show concern for this question, study it, and make a scientific forecast of it.

CSO: 4008/353

## NATIONAL DEVELOPMENTS

### BRIEFS

BOOK ON TECHNOLOGY--Changsha, 13 Jun (XINHUA)--The book, "Face the New Technological Revolution" (Vol I), was published by the Hunan Science and Technology Publishing House on 13 June. It will be sold at XINHUA bookstores throughout Hunan Province and throughout the nation. Comrade Wang Zhen wrote the title of the book, and Comrade Fang Yi wrote an article in lieu of its preface. The book was compiled on the basis of 10 lectures given during the first phase of the "lecture series on the new technological revolution" sponsored by the CPC Central Committee's Organization Department, the Ministry of Labor and Personnel, the State Science and Technology Commission, the Chinese Science and Technology Association, the party committee of units directly under the CPC Central Committee and the party committee of central state organs. It explains from various angles the background, characteristics, impact and development of the world's new technological revolution and introduces some new sciences and technologies, the situation in industrial development and some basic knowledge. [Text] [OW181245 Beijing XINHUA Domestic Service in Chinese 1649 GMT 13 Jun 84]

CSO: 4008/353

## APPLIED SCIENCES

### PRC, ITALY COOPERATE ON SPACE TECHNOLOGY

OW112200 Beijing XINHUA in English 1505 GMT 11 Jun 84

[Article by Huang Changrei and Fu Wenlong]

[Text] Rome, 11 Jun (XINHUA)--Italy, with no space technology whatsoever at the turn of the 1960's save a few ground stations, has now an exploratory satellite of its own orbiting the earth.

The satellite, "Sirius One", was successfully launched into space in 1977 from the Kennedy launch site at Cape Canaveral in the United States and is still functioning normally, far exceeding its expected lifespan of 2 years. Component parts of the satellite, including the solid propellant rocket engine, optical sensor, satellite structure and temperature control system, were all made in Italy.

In 1964, Italy took its first step toward space exploration by launching a scientific exploratory satellite, the "San Marco One", in cooperation with the United States.

Italy is planning to send "San Marco Four" into space this year. It also plans to launch another telecommunications and experimental satellite "Italsat" in 1987, which, with its six point-wave beam antenna, will cover the whole country. By the end of the present decade, Italy is expected to have five satellites of its own circling the earth.

Italy is the fourth partner in the European Space Agency and takes part in the research and development of rockets and various types of scientific and applied satellites.

Italy's space research lays emphasis on applied technology and technology transfer, facilitating the flow of achievements from college labs and research centers to industrial sectors, and, when commercialized, from domestic to European and international markets. For the time being, research work is centered on space communications, geodetic survey, remote-sensing, ionospheric study, outer-space detection, chemical propulsion system, and development of new materials such as gallium-arsenic materials.

At present, there are 15 companies and enterprises in the country engaged in space research with a staff of nearly 2,200.

The "Piero Fanti" telecommunications space center in central Italy, the biggest of its kind in Europe, has been in commercial use since 1968, linking the country with over 70 countries through its telephone, telegram, television, and data transfer services. The station also renders services in remote measurement, remote control, measurement of orbit and monitoring.

Exchanges of space technology have been conducted between China and Italy over the past years, and the link opened last June through "Sirius One" has brought closer cooperation between the two countries' scientists and technicians. Last July, Chinese President Li Xiannian had a friendly conversation with Italian President Sandro Pertini over the line. During the past year, scientists of the two countries have been conducting tests on 12,000-18,000 megahertz carrier wave communications. Future tests are also planned on digital television, clock synchronization, date transfer, and press facsimiles.

Last March, Chinese Minister of the Aeronautics Industry Zhang Jun and his Italian counterpart Luigi Granelli signed a protocol in Rome which will open up broad prospects for cooperation between the two countries in space science and technology.

CSO: 4010/118

## APPLIED SCIENCES

### PRC SCIENTISTS JOIN EUROPEANS IN NUCLEAR RESEARCH

OW070906 Beijing XINHUA in English 0706 GMT 7 Jul 84

[Text] Geneva, 5 Jul (XINHUA)--Scientists at the European Nuclear Research Center have proved the existence of the "t-quark", which, along with five other kinds of quarks already discovered, is said to complete the list of the basic structural components of matter.

The discovery marks "an important stage in efforts by European scientists in acquainting themselves with the basic laws of nature," says a press communique issued by the center today.

It was previously predicted by scientists engaged in research on subatomic subjects that there must be six kinds of quarks in the ultimate structure of matter. The discovery of the "t-quark", or "top-quark", has testified to the correctness of the prediction.

The discovery was made by 151 scientists working for the "UA-1" experiment at the center after analyzing data collected in 1983. The "mass" of the newly-discovered quark has been measured between 30 and 50 times of the proton.

The European Nuclear Research Center, based here, has brought together 2,600 scientists, including some from China, from 160 universities and laboratories of the center's 13 member countries with the task of conducting research on subnuclear particles and the weak force.

The discovery of the w and z particles at the center last year was seen as an important breakthrough in the exploration of the mysteries of nature.

CSO: 4010/118

## APPLIED SCIENCES

### APPLIED NUCLEAR TECHNOLOGY FINDS WIDE RANGE OF APPLICATIONS

OW300318 Beijing XINHUA in English 0256 GMT 30 Jun 84

[Text] Beijing, 30 Jun (XINHUA)--A total of 1,700 radiation instruments are now used in China's textile, printing, papermaking, plastics, petroleum, chemistry and other undertakings, says the 27th issue of the English-language weekly BEIJING REVIEW to be published here next Monday.

In the chemical industry, the weekly says, nuclear radiation has helped China develop a dozen badly needed new materials, which have been used in satellites, submarines and telecommunications.

Radioactive surveying is now indispensable in oil and coal prospecting and exploration, the magazine added, and 4,000 to 5,000 oil wells in the country are surveyed with this technique every year.

BEIJING REVIEW says that in water conservation, radioactive sand gauges have been installed in 12 measuring stations along the Yellow River to survey the changing silt content in the water.

In medicine, more than 800 units are now using 100 types of isotope therapy to diagnose and treat 18 million patients every year, the weekly says.

Other nuclear techniques have been used to provide important data for research in physics, chemistry, biology, archaeology and environmental protection, it added.

China began research on applied nuclear technology in 1956, the magazine recalled, and emphasis was first put on agriculture and medicine. After more than two decades of efforts, China now ranks among the world's leaders in using radiation to develop new crop strains.

China has also achieved considerable successes in using radiation to increase silkworm production, fish and shrimps, control insects and preserve food.

CSO: 4010/118



APPLIED SCIENCES

BRIEFS

LARGEST TELESCOPE BEING INSTALLED--Beijing, 12 Jul (XINHUA)--A 1.56-meter-diameter astronomical telescope is being installed in Shanghai. The computer-controlled telescope is housed in a newly-built dome on the top of 77-meter-high Sheshan hill, 38 kilometers west of the city proper. It was designed by astronomers from the Shanghai observatory and manufactured in Shanghai to analyze the chemical composition of the Stellar system, its laws of motion and the structure of the Milky Way. Up to now Shanghai has only had a 40-centimeter-diameter double astronomical telescope. The new telescope will be the largest in China. [Text] [OW120932 Beijing XINHUA in English 0736 GMT 12 Jul 84]

CSO: 4010/116

## Acoustics

AUTHORS: GAO Zongfa [7559 1750 4009] and XU Qichang [1776 0366 2490]

ORG: Both of Institute of Acoustics, Chinese Academy of Sciences

TITLE: "Broad-band Underwater Transducer and Its Acoustic Field"

SOURCE: Beijing YINGYONG SHENGXUE [APPLIED ACOUSTICS] in Chinese Vol 3,  
No 1, Jan 84, pp 8-13

ABSTRACT: A broad-band sound emitting source is more desirable for measuring broad-band signals and improving the signal-to-noise ratio. A transducer made of an array of four pairs of different PZT tubes was fabricated. The large diameter tube was in the middle and the tube diameter was decreased at the top and the bottom. The least square method was used to calculate the acoustic transmission field of this array. Furthermore, the two vibrational modes of each tube and their mutual transmission effect were taken into account to calculate the directivity pattern, transmission voltage sensitivity and electrical conductivity of the transducer underwater. Experimentally, the broad-band transmission objective was met. The transmission voltage sensitivity was found to be  $s = 140 \pm 3 \text{ dB}$  ( $\text{OdB} = 1 \mu \text{ Pa/v} \cdot \text{m}$ ). The electroacoustic efficiency was greater than 50 percent. Between 16-80 kHz, the experimental curves for transmission voltage sensitivity and underwater electrical conductivity agreed with theoretical ones. The experimental perpendicular directivity pattern below 25 kHz was also in agreement with the theoretical calculation. However, the deviations in position and magnitude of the side lobe in the directivity pattern became significant at above 35kHz. The transmission voltage sensitivity and electrical conductivity also varied significantly at above 80 kHz. The theoretical values were higher than measured results because mechanical losses were not included. The theoretical computation was performed on a DJS-6 computer with a Fortran program.

12553

CSO: 4009/45

AUTHOR: GENG Chengde [5105 2052 1795]

ORG: The 715th Institute

TITLE: "Effect of Element Factors on Directivity Gain of Phased Receiving Array"

SOURCE: Beijing YINGYONG SHENGXUE [APPLIED ACOUSTICS] in Chinese Vol 3  
No 1, Jan 84, pp 24-29

ABSTRACT: The spatial directivity formula for a plane grid array with directional elements was given. Then, the general expression for the directivity coefficient of a phased plane grid array was derived according to definition. Subsequently, three ideal element factors were used to derive specific formulas in order to obtain explicit functional expressions to facilitate numerical computation. The formula correlating the directivity gain of a two-dimensional phased plane grid array to the phase angle was also given. Furthermore, the corresponding linear array was also discussed. Finally, results of numerical calculations were analyzed to reach the following conclusions. The directivity gain of a linear array comprised of non-directional elements increases with increasing phase control angle when the element spacing is less than half a wavelength. The gain of a linear array comprised of directional elements decreases with increasing phase control angle. The directivity gain of a plane grid array always decreases with increasing phase control angle regardless of the element factors and spacing. Since elements are always directional, it is important to improve the element factors and to select a suitable spacing to minimize the loss at a large angle. The same formula and corresponding conclusions are still applicable to a phased transmission array after undergoing velocity control for each element in various directions in the array.

12553

CSO: 4009/45

AUTHOR: LAN Jun [5695 6511]

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TITLE: "Effect of Plane Baffle on Directivity of Transducers"

SOURCE: Beijing YINGYONG SHENGXUE [APPLIED ACOUSTICS] in Chinese Vol 3  
No 1, Jan 84 pp 14-19

ABSTRACT: The effect of an infinitely large plane baffle on the directivity of transducers was studied using beam acoustics and an imaginary source method. A formula to calculate the directivity function of a point source in front of an infinite plane baffle was used to calculate the directivity patterns for a number of typical baffles, including a rigid baffle, an absolutely soft baffle, a semi-infinite medium and a medium layer with a thickness  $l$ . The latter was further divided into a transmission layer baffle and a cavity baffle. The relation between the directivity function angle and baffle parameters was also determined. Furthermore, the effect of transverse wave on the baffle was also investigated under various conditions. Some patterns were obtained which might be useful in the engineering design of baffles. When both longitudinal and transverse waves were considered, the measured curve was found to be in good agreement with the calculated result.

12553

CSO: 4009/45

AUTHOR: ZHANG Kesen [1728 0344 2773]

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TITLE: "An Underwater Transducer Suited for Sound Controlled Ignition"

SOURCE: Beijing YINGYONG SHENGXUE [APPLIED ACOUSTICS] in Chinese Vol 3  
No 1, Jan 84, pp 20-23

ABSTRACT: A transducer capable of transmitting and receiving acoustic signals suited for underwater sound controlled ignition was developed. A rectangular piston type semi-spatial transmission structure was used to meet the directivity requirement. The  $d_{33}$  resonance operating mode was adopted to obtain the necessary sensitivity. The frequency constant was measured to be 1,378.8 kHz·mm with an error of approximately  $\pm 2$  percent. The electrical conductivity--frequency characteristics were obtained in both water and air. The receiving and transmitting sensitivities were also determined. Experimentally, the target acoustic signal was found to be highly directional, which was in agreement with the theoretical directivity pattern of the transducer. It was highly capable of suppressing interference signals and sustaining a high water pressure. The sensitivity and acoustic power were also found to be sufficient. Furthermore, its structure was simple and compact and its behavior was consistent. Moreover, it could be made as an independently interchangeable component. Its performance had been satisfactorily demonstrated in the sea.

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CSO: 4009/45

END